THE EXISTANCE OF THEORY ELECTRONICS PROPINQUITY AND ICT COMPETENCY AMONG NURSES STAFF: A MALAYSIAN CASE STUDY

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Abstract
This research has been exploring the existence of the theory electronic propinquity by using the facilities of modern technology such as the computer and internet in the communication process. This research also looking examines the Information Technology competency among the hospital staff such as nurses. Electronic Propinquity theory is one of the theories under the Media and Communications theory developed by Korzenny in 1978. Although this theory has been used extensively, studies concerning the advantages of using information technology in management communication in hospital management are not as common. The results of this study also attempt to update Korzenny's theory to the present generation. This study uses a Qualitative methods approach on 22 respondents. This study was conducted at the four government hospitals in Malaysia: Selayang's Hospital, Sultanah Bahiyah Hospital, Queen Elizabeth Hospital and Putrajaya Hospital. These hospitals are chosen because they are the first four hospitals in Malaysia using full computerised technology in management. Furthermore, they were also recommended by the Ministry of Health in Malaysia. Basically, the questions in the survey form are based on the elements contained in the theory of electronic propinquity. The result of the study found that, the staff is aware of the existence of Electronic theory Propinquity when using communication technology and the level of IT competency is high among staff Nurses.

Introduction
In Malaysia, ICTs are now used as a channel for communication among the staff at government hospitals. As a developing country, Malaysia is trying to achieve maximum development; so, currently there is an increased need to develop technology in management. At this time, technology facilities are considered to be a basic need in the administration of a country. Some countries have been assisted by ICT, including South Korea, USA, Canada, United Kingdom, Netherlands, Norway, Demark, Australia and several other developed countries. Malaysia is trying to place themselves in an active list of the top countries using the application of technology in management. Thus, the existence of the Multimedia Super Corridor (MSC) in Malaysia is considered one of the hallmarks of the sincerity of the government in this regard. However, the quality of the e-services is also important. Despites the existence of the best systems and facilities, it is useless without the high quality of maintenance and services from the providers. To ensure the highest quality of e-services given, it should be maintained and reviewed regularly from time to time.

Thus far, the Malaysian government already applies information technology in public development including in education, accounting, medical, safety, and in almost all sectors under government administration. At this level, implementation only has been achieved; however there is not much research concerning explained about the advantages when the tech administration systems used in serious. This study focuses on the use, and feedback of information systems in hospitals by the hospital nurses. In reality, hospitals are faced with hundreds of patients every day and this number is increasing over time. This scenario, of course, requires nurses to operate an effective information management system in order to assist in expediting patients' treatment or to help expediting nurses in managing the patients' records.

In Malaysia, with a population of 27 million, the government has limited channels to disseminate important information to its citizens. This increase in population also results in a gap in the relations among the communities themselves. This can be seen in organizations; the number of employees has increased. Increase in the number of government workers leading to increase in the number of buildings provided for sufficient workstation. This scenario creates communication gap between workers and staff within the same organization because of the separate workplace and workstation. Thus, telecommunication system is considered to be able to bridge this gap among the staff and workers of an organisation and in this instance, a hospital. An organization will normally be divided into certain departments and units. Some buildings also act as a boundary between departments, thereby increasing the relationship gap. Thus, inter-departmental relationships become increasingly distant and disconnected. The problem in communication between the staff is that information flow becomes slow and less efficient. In other words, as a company increases the number of workforce, so it will increase the number of its buildings, thereby creating a division between departments. This, in turn, increases the communications difficulties between staff, and information transfer becomes slow and less efficient. This occurred in Malaysia when the number of nurses increased in line with the increase in the number of patients over time. Therefore, improvements in the channels of communication and management also have to be made in line with the government's goal to create electronic government.

The Ministry of Health has already taken some steps to achieve the goals of the country using electronic systems in management. One of its efforts is the Malaysian 6th plan where the government suggested that all hospitals in Malaysia fully utilise aspects of information technology management. The results of this are recorded in the 2000 Malaysian Health Ministry Annual Report. Some hospitals have also introduced an electronic based management system, i.e. in 1998, Selayang's Hospital, followed by Putra Jaya Hospital in Selangor, Sultanah Bahiyah Hospital in Kedah and Queen Elizabeth Hospital in Sabah. By 2007, all hospitals in Malaysia were equipped with electronic facilities. As a combination of Malaysia's population increase and the increase in the total expenditure in the government sector, all hospitals in Malaysia have complete communication technology facilities to support the integration of electronic propinquity in hospital.

For the long term, the introduction of information technology systems is necessary, due to the terrain in Malaysia. The structure of land area in Malaysia, comprising of hills and mountains, requires the use of new media to disseminate information to residents who live in rural areas or far from the city centre. Transport or communication costs will be higher if the hospital maintains traditional ways to communicate with those who live remotely. With the creation of new media, dissemination of information related to the development of community health is cheaper and faster. Hence the construction of an infrastructure of information technology in Malaysia can be considered as a positive move toward disseminating information to the population in Malaysia. Based on the scenarios that occur in Malaysia, this study is important because the findings may provide answers to the government with regard to its revenue concerning the introduction of new media as a medium of communication. If there is no effort to use technology to improve the facility level, the level of productivity among the staff in the organisation in terms of receiving information is diminished. Long-term efforts to improve the quality of

management are very difficult to achieve. The findings of this study will also explain the advantages of using information technology as a tool to strengthen the relationship between human beings.

Objectives and Research Questions Limitation of the research
To research the study, the following objectives are developed:
To examines the applicability of the theory of Electronic Propinquity (EP) in the hospital management system in Malaysia.
To examine the level of IT literacy among nurses.

Research Questions
RQ: What is the level of IT competency of nurses in hospital?
Significance Research
In Malaysia, a study on nurses shows the effects of information technology are very limited. The main significant result of this study will determine whether information technology systems weaken the communication gap that exists among the nurses. This study will also be associated with the theory of electronic propinquity to observe how proximity can be seen in terms of distance, physical space and time. The study will, additionally, examine the factors that influence the proximity of the aspects of existence among employees who use information technology facilities in administration. The study results will give a clear picture to the hospitals' staff, other government departments and the government itself in general. Whatever the results obtained through this study, they can be used as input to the government as to whether to maintain existing policies or make changes to improve implementing its use among other sectors in the future. This is because this development certainly requires a substantial cost to implement, manage and maintain it. Furthermore, this study is also considered significant because the research methods used focus on a combination of methods: quantitative and qualitative. This is to ensure that all the research questions and hypotheses can be answered. Therefore, through qualitative method will see the actual situation in the industry through data obtained from the respondents. Finally, this study will also provide a clear picture of the nurses regarding the importance and need for them to accept technological innovation in the management system. Subsequent to this study they will have the opportunity to provide feedback about their needs to receive training to enhance skills and competencies over time.

This research focuses on the study of hospital staff consisting of employees who serve in public hospitals in Malaysia. This study focuses only on the nursing staff. The selection was made as nurses make up the largest number of staff in the hospital compared with other positions. McCannon and O'Neal (2003) explain: Preparing nursing students for practice in the 21st Century must include information technology in the undergraduate nursing curricula." McCannon and O'Neal (2003) added, "in the history of nursing, informatics was a specialized area studied at the graduate level; however the current health care environment demands information technology skills at all levels of nursing practice.

In addition to dealing with patients, nurses also have administrative duties to manage patient records and information systems. Therefore, the nurse can be found in any part of the hospital, whether clinical or management of administrative divisions. Selection of nurses in this research is also supported by hospital administration as a group of employees who made up of the highest number of personnel in health administration. Normally nurse midwives and medical assistant representatives are always present in remote villages far from town centres. This is one of the reasons why many people avoid the choice of a nurse as a career. However, now, the responsibility and image of a nurse is expanded and the role played is higher. Starting as a trainee at the Centre for nursing, the syllabus given to nurses has expanded to include learning about information technology. Thus, the standard, as well as the knowledge, of a nurse is much higher, now, than before.

Essentially the duty of a nurse is to assist customers, whether healthy or sick, in the conduct of activities that lead to the development of health, cure diseases and reduce mortality. However, the use of this information has also enabled a change and quality in nursing to become more efficient. The introduction of an information technology channel has also enabled the working environment to become more comfortable and smooth. The changes in the use of information technology have also improved patient care by shortening the time for system documentation and making patient data retrieval more rapid. In addition, the use of management information systems also simplifies the process for decisions and launch of management systems in hospitals generally. All work currently undertaken manually will be changed and replaced with software that can help facilitate all matters involving health care facilities and medical records without using paper. Apart from the administrative staff, nurses are among the medical staff that will always deliver the orders, and place requests involving patient records. The daily routine of hospital staff includes the need to send messages for laboratory materials needed by a particular unit or requirements between units that entail documents or materials from certain units. Electronic data storage is also required when a nurse needs to store patient data; updating medical records and recommendations must be recorded to help patients learn how to care for themselves or things that need to be done to manage the diseases that they have.

In addition, task demands often put a nurse in a situation where she is managing several tasks simultaneously. For employees who work in the development of health, of course, the latest information related to the health of local residents can be found on the internet. For the information from the health ministry, the nurse should give some guidance to the community on how to get the latest information related to recent disease issues and how to obtain brochures through the internet. The role played by nurses is very important; communication between staff is also considered an important activity in the hospital. In addition to the traditional methods of face to face and telephone communication, processes are influenced by technology by using Chat or email that allows them to send reports, papers and patient records. Now, all the data is stored electronically. Interestingly, there are limited studies on hospital nurses - a group of employees in the hospital who play a big role in supporting the whole system. This is because nurses now have a very large role in the medical world. The nurse is considered as an assistant to the doctor and at the same time works with medical doctor's clinical procedure; even in cases of emergency, in the absence of a doctor, the situation can often be managed by a nurse. Along with that, the increase in the establishment of the number of hospitals, medical centres and medical colleges, both government and private sector, has opened up greater opportunities for nurses to improve their status. Therefore, the study of electronic proximity effects should focus on groups of nurses.

Finding
The Level of IT Competency
The level of nurses' IT competency is assessed by adopting instrument used by Amran Rasli (2003) developed to evaluate clerical workers in using ICT based facilities. This instrument is suitable to be used in this study as it has a few similarities in term of respondents in both of the studies are government workers and they have to use ICT based facilities in their daily work. Furthermore, both of the studies are based in Malaysia where similar influencing factors involved especially in the aspect of culture and working environment.

Aspects of IT competency assessed (Amran Rasli, 2005) are: Overall IT Competency (Overall); database (DB); Graphic (Gr); Word Processing (WP); Spreadsheet (SS); Communication and Internet (C&I); General Computer Operation (GCO) and General Technology Application (GTA). The researcher had used Terrell transformation technique 2000 to convert ordinal data into indices, based on the following formula (Amran Rasli, 2005):

Transformed Score = [(actual raw score-lowest possible raw score)/ possible raw score range] x 100.

For each item, the checklist is rescaled to the higher competence respondent with higher numerical value as follows:

Response choice	Final Value
Have not observed	1
Have observed	2
Perform with supervision	3
Perform without supervision	4
Can do and instruct others	5

In this research, for example, if a respondent responded to the checklist with 'Perform with supervision' to the entire questions in the general technology application (GTA) domain, she would have a raw score of 18, calculated by (3+3+3+3+3+3). Subsequently, if another respondent responded with 'Have observed' to all the questions in the general technology application (GTA), the raw score would be 12 (or 2+2+2+2+2+2).

With the checklist in Appendix 3, for example, respondent X's answers in the aspect of Communication and Internet (C&I) are as follows:

	Have Not Observed	Have Observed	Perform with Supervision	Perform Without Supervision	Can Do and Instruct Others
II. Communication and Internet					
Individuals should be able to use e-mail and the Internet to communicate and locate Information. This would include the ability to:					
A – use e-mail to:					
1. send and receive e-mail Messages			**X**		
2. enclose and recover documents attached to e-mail messages		**X**			
B – use the Internet to:					
1. access the Internet with a Browser		**X**			
2. navigate the Web by use of links and URL addresses		**X**			
3. use search engines to locate desired information		**X**			
4. download and print desired items from the Internet		**X**			
5. access and contribute to chat rooms and newsgroup		**X**			
6. create World Wide Web pages		**X**			
7. use a Web Publishing tool		**X**			
8. organise and moderate a synchronous computer conference using chat tool		**X**			

Therefore, the calculation of the raw score for Anita in C&I is 3+2+2+2+2+2+2+2+2+2= 21, subsequently, her C&I competency is (21-10)/ 40 * 100 = 27.50 (rounded into two decimal points). For each aspect, the same formula is used and the IT competency is calculated. Detailed results of each respondent are shown in table 5.1.

Based on Table 5.1, it was confirmed that most of the respondents have high levels of competency in Word Processing (98.00), Communication and internet (87.32), and Spreadsheet (81.86). Among the lowest levels of competency are in the aspect of database (72.86), General Technology Application (77.24), and Graphic (78.11). The mean competency for all respondents is 82.00 and this is considered quite high. In the other words, the second proposition is rejected. Respondent with the highest level of competency is respondent L who is working in administrative department and has an experience for 18 years under her belt.

Table 5.1: Nurse Workers' IT Competency

Name	GR	DB	SS	WP	GCO	C&I	GTA	Overall
A	83.33	79.00	100.00	97.00	98.00	90.00	71.00	88.33
B	71.00	86.00	97.00	98.00	90.00	85.00	79.20	86.60
C	83.70	73.00	83.33	98.20	90.00	76.00	79.20	83.34
D	75.00	91.10	88.00	98.00	58.00	95.00	87.50	84.60
E	67.00	53.35	75.00	100.00	70.00	75.00	58.00	71.20
F	75.00	71.42	77.00	98.00	75.00	90.00	63.00	78.50
G	71.00	71.42	90.00	98.00	74.00	85.00	62.00	78.80
H	63.00	66.00	73.00	100.00	79.00	90.00	42.00	73.30
I	83.00	75.00	87.00	96.00	85.00	100.00	79.20	86.50
J	83.33	77.00	83.33	69.00	75.00	100.00	87.00	82.09
K	50.00	95.00	72.00	86.00	74.00	85.00	79.20	56.60
L	100.00	82.14	85.00	92.40	84.00	100.00	100.00	91.93
M	83.33	63.00	73.33	92.40	90.00	100.00	79.20	83.04
N	67.00	71.00	85.00	90.22	90.00	100.00	87.50	84.40
O	83.33	75.00	72.00	91.50	81.25	77.50	87.50	81.20
P	75.50	82.00	82.00	92.40	80.00	85.00	75.00	82.00
Q	92.00	63.00	85.00	94.60	73.00	85.00	79.20	82.00

R	88.00	68.00	77.00	95.00	76.00	82.00	78.00	80.60
S	83.00	55.00	77.00	94.00	69.00	72.00	88.00	76.90
T	86.00	66.07	85.00	91.30	71.25	86.00	79.20	80.69
U	67.00	71.42	77.00	96.00	74.00	85.00	79.20	78.51
V	88.00	68.00	77.00	92.40	73.00	77.50	79.20	79.30
Mean	78.11	72.86	81.86	98.00	78.60	87.32	77.24	82.00

Overall IT Competency (Overall); database (DB); Graphic (Gr); Word Processing (WP); Spreadsheet (SS); Communication and Internet (C&I); General Computer Operation (GCO) and General Technology Application (GTA).

Finding and Discussion

The findings of this study showed that the level of IT competency of the nurses is high. The result of the study is also in agreement with the introduction of MOHCube system on February 1, 2007 by Malaysia Ministry of Health in order to assist in increasing the quality of health services in Malaysia. The use of this system leads to demands for high skill personnel and it is considered as a positive self-development especially from the aspect of communication. Although the system is only applied in hospital management aspect, it will indirectly leads to high quality health services to the public in long term. This fact is supported by Burgelman *et al.* (2004) who stated that the main focus of e-government is to give the best service to the society. Besides, Symonds (2000) explained that implementation of ICT concept by the government can strengthen the bond between the government and the public. Meanwhile, Hazlett and Hill (2003) emphasized the role of government to bring about the fundamental change in the way of IT use.

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